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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Yasushi Akiyama

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AZ ELECTRONIC MATERIALS USA CORP.
ATTENTION: INDUSTRIAL PROPERTY DEPT.
70 MEISTER AVENUE
SOMERVILLE, NJ 08876

EXAMINER

ROBINSON, CHANCEITY N

ART UNIT

PAPER NUMBER

1795

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/518,105	Applicant(s) AKIYAMA ET AL.	
	Examiner CHANCEITY N. ROBINSON	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1 is/are allowed.
- 6) ☒ Claim(s) 2 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The Applicant's request for reconsideration filed on October 13, 2009 was received. Claims 1 and 2 have been amended.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on June 15, 2009.

Claim Rejections - 35 USC § 103

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takano et al. (JP 2002006514).

With regards to claim 2, Takano et al. disclose a composition used to form a patterned resist wherein the composition contains a surfactant that is a C4 to C10 perfluoroalkyl sulfonic salt (paragraph [0016 and 0018]).

Takano et al. do not explicitly teach the specific ratio of the surfactant's acid to base content of 1:1.04 to 1:3. Also, Takano et al. do not explicitly disclose further the composition is used for preventing development-defects has an equivalent excess of base as compared to acid. However, Takano et al. teach that adjusting the mixing ratio of the acid to base affects the reduction of thickness of the resist. The film loss in quantity at the time of development can be adjusted (paragraph [0019]). Therefore, the mixing ratio is the result effective variable. As such, it is optimizable (In re Boesch, 617 F.2d 272,205 USPQ 215 (CCPA 1980) MPEP 2144.05). It would have been obvious to one of ordinary skill in the art to optimize the ratio of the surfactant because adjusting the mixing ratio directly affects the film loss of the resist.

Examiner notes that the claim limitation, "is used for the process of forming a resist pattern that increases the amount of reduction in thickness of a chemically amplified positive

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photoresist coating after development by 100 Å to 600 Å in comparison with the case of not applying the composition for preventing development-defects, comprising: a step of forming a chemically amplified positive photoresist coating on a substrate having a diameter of 8 inches or more by application; a step of applying a composition for preventing development-defects containing a surfactant on the chemically amplified positive photoresist coating; a step of baking after at least either the step of forming the chemically amplified positive photoresist coating by application or the step of applying the composition for preventing development-defects; a step of selectively exposing the chemically amplified positive photoresist coating; a step of post-exposure baking the chemically amplified positive photoresist coating; and a step of developing the chemically amplified positive photoresist coating” is an intended use of the composition. *In re Leshin*, 125 USPQ 416, 417-418; 277 F2d 197 (CCPA 1960). The composition of Takano et al. and the instant application are the same and therefore, the compositions of Takano et al. and the instant application are capable of performing the same functions.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berger et al. (US 2005/0100814).

Regarding claim 2, Berger et al. disclose a photoresist composition (abstract) used for positive-working photoresist [0002]. The composition comprises novel bases and surfactant that may be used with polymer composition having high UV transparency [0002]. In positive chemically amplified photoresist it has been found that adding a small amount of base can significantly improve various imaging properties [0007]. It has also been found that surfactants added to the resist formulation can improve the coatability and/or developability of the resist composition leading to improved imaging properties [0007]. The bases of the composition have a

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pKa of about 5 or greater [0025] such as tetrabutyl (alkyl) ammonium hydroxide (salt; [0156]).

The surfactants are fluorinated surfactants [0026] such as perfluorooctanoic acid ammonium salt or perfluorononanoic acid ammonium salt [0156]. The bases and surfactant are presented in amount of 0.001 to 5.0% [0157].

Berger et al. do not explicitly teach the specific ratio of the surfactant's acid to base content of 1:1.04 to 1:3. Also, Berger et al. do not explicitly disclose further the composition is used for preventing development-defects has an equivalent excess of base as compared to acid. However, Examiner notes that the base of Berger et al. is highly basic with pKa value of 5 or greater [0025]. Therefore, one of ordinary skill in the art would recognize that the surfactant combined with base would be considered highly basic meaning the composition would have an equivalent excess of base as compared to the acid.

Examiner notes that the claim language of "is used for the process of forming a resist pattern that increases the amount of reduction in thickness of a chemically amplified positive photoresist coating after development by 100 Å to 600 Å in comparison with the case of not applying the composition for preventing development-defects, comprising: a step of forming a chemically amplified positive photoresist coating on a substrate having a diameter of 8 inches or more by application; a step of applying a composition for preventing development-defects containing a surfactant on the chemically amplified positive photoresist coating; a step of baking after at least either the step of forming the chemically amplified positive photoresist coating by application or the step of applying the composition for preventing development-defects; a step of selectively exposing the chemically amplified positive photoresist coating; a step of post-exposure baking the chemically amplified positive photoresist coating; and a step of developing

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the chemically amplified positive photoresist coating” is an intended use of the composition. *In re Leshin*, 125 USPQ 416, 417-418; 277 F2d 197 (CCPA 1960). The composition of Berger et al. and the instant application are the same and therefore, the compositions of Berger et al. and the instant application are capable of performing the same functions.

Response to Arguments

5. Applicant's arguments filed 10/13/2009 have been fully considered but they are not persuasive. Applicant argues that Takano teaches that positive chemically photoresist require only an acidic composition, and further that negative chemically amplified photoresist require a weakly acidic to alkaline composition [0018]. The present invention related to a positive photoresist. Therefore, there is no teaching in Takano that would lead one of ordinary skill in the art to make a positive photoresist with excess of base relative to acid and also expect to obtain a reduction in film thickness of 100-600 Å. It is unexpected combination of a specific surfactant in a specific ratio that leads to the loss of film thickness in the range of 100-600 Å for a positive photoresist without the undesirable T-tops in the pattern. Thus, the Examiner is requested to remove Takano as a prior art reference.

Examiner respectfully disagrees. Examiner notes claim 2 only recites a composition comprising of a composition which contains a surfactant. Examiner notes that the claim language of “is used for the process of forming a resist pattern that increases the amount of reduction in thickness of a chemically amplified positive photoresist coating after development by 100 Å to 600 Å in comparison with the case of not applying the composition for preventing development-defects, comprising: a step of forming a chemically amplified positive photoresist coating on a substrate having a diameter of 8 inches or more by application; a step of applying a composition

for preventing development-defects containing a surfactant on the chemically amplified positive photoresist coating; a step of baking after at least either the step of forming the chemically amplified positive photoresist coating by application or the step of applying the composition for preventing development-defects; a step of selectively exposing the chemically amplified positive photoresist coating; a step of post-exposure baking the chemically amplified positive photoresist coating; and a step of developing the chemically amplified positive photoresist coating” is an intended use of the composition. In response to applicant's argument that composition is used for a positive photoresist, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. *In re Leshin*, 125 USPQ 416, 417-418; 277 F2d 197 (CCPA 1960). Therefore, the rejection is maintained.

Examiner has not discovered citations recited by the applicant with regards to “Takano teaches that positive chemically photoresist require only an acidic composition, and further that negative chemically amplified photoresist require a weakly acidic to alkaline composition in paragraph [0018]”. Paragraph [0018] of Takano et al. only disclose the types of surfactant being used. There is no mention of a positive or negative photoresist resist requiring only an acidic composition or a weakly acidic to alkaline composition. Therefore, the rejection is maintained.

Further, Tanako et al. disclose a surfactant consisting of a tetramethylammonium salt of perfluoroalkyl carboxylic acid C7-C10 or perfluoroalkyl sulfonic acid and its tetramethylammonium salt of C4-C10 in paragraph [0018], which meets the limitation of instant application of a surfactant consisting of a tetraalkylammonium salt of C4 to C15

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perfluorocarboxylic acid and tetraalkylammonium salt of C4 to C10 perfluoroalkylsulfonic acid as recited in claim 2. Takano et al. and the instant application recite the same specific surfactants to be used in the composition. Also, Tanako et al. suggest that the pH can be properly adjusted depending upon the type of amplified resist to be used or processing conditions (paragraph [0020]). Tanako also teaches that in a photoresist, the pH is preferably 1.7 to 3.5. If more base is added, as one skilled within the art would know that the pH would be above the range. One of ordinary skill within the art would know how to adjust the ratios to achieve the desired effect. Further, the composition as disclosed by Tanako comprises each and every aspect of the claim invention with the exception of the acid to base ratio within the surfactant. Tanako does teach that such mixing would be apparent or else the addition of more acid to base would not have been noted as being preferred to adding just acid or base (paragraph [0020]) to obtain reduction in film thickness. The claimed ranges of the surfactant 1: 0.9 are so close to the ranges as claimed by the applicant (1:1.04) that there would not be any difference (whether functional or structural) within the claimed composition (*Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985)). Therefore, the rejection is maintained.

13. The declaration filed under 37 CFR 1.132 filed October 13, 2009 is insufficient to overcome the rejection of claim 2. The Examiner understands the declaration's example should closely resemble the prior art of record, Takano et al. Examiner notes that applicant previously submitted a declaration filed under 37 CFR 1.132 filed March 06, 2009 that showed in table 1 on page 3, example 1 had an acid to base ratio of 1:0.9 with 171 A which was almost rectangular for the pattern profile; however, the paten profile of table 1 of example 1 on page 11 of the newly submitted declaration filed October 13, 2009 has been changed to T-top. Applicant did not

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mention any typographical error or new test run for example 1 in the arguments or declaration submitted on 10/13/2009. Examiner requests applicant to disclose whether this was a typographical error or a new test run for example. Further, upon review of examples 2-6 and examples 1-2 in the specification, Example 2 shows that the pattern profile at a ratio of 1:1 and reduction in film thickness of 210 Å is almost rectangular. Example 1 in the specification (instant application) shows that the pattern profile at a ratio of 1:1.04 and reduction in film thickness of 230 Å is almost rectangular. Example 3 shows a ratio of 1:1.3, wherein the shape is rectangular. There is a huge gap between the ranges of Example 1 in the specification, Example 2 and Example 3 leading one of ordinary skill in the art to believe that the pattern profile would be expected to be rectangular. This is due to the amount of base added in Example 2, wherein applicant's claimed range of 1:1.04, is very close to the range of 1:1 (example 2). Therefore, the results are not commensurate in scope with the claims.

Allowable Subject Matter

6. Claim 1 is allowed.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHANCEITY N. ROBINSON whose telephone number is (571)270-3786. The examiner can normally be reached on Monday to Thursday: 7:30 am-6:00 pm eastern time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on (571)272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Chanceity N Robinson/
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/Cynthia H Kelly/

Supervisory Patent Examiner, Art Unit 1795